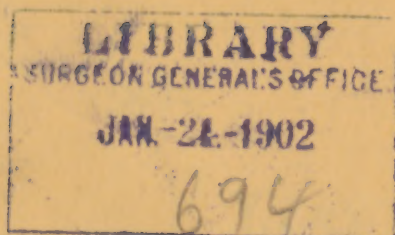


GROSS (O.B.)

Report of Special
Sanitary Inspector
for Camden, N.J. _____

1884

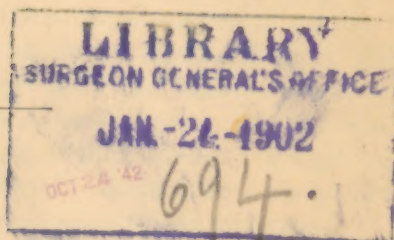


REPORT
OF
SPECIAL SANITARY INSPECTOR
FOR
CAMDEN, N J.

AS MADE TO THE NEW JERSEY BOARD OF HEALTH,

BY
ONAN B. GROSS, M.D.

1884.



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REPORT

SPECIAL SANITARY INSPECTOR

CAMDEN, N. J.

OF THE BOARD OF HEALTH OF THE CITY OF CAMDEN, N. J.

WAS. B. GIBBS, M.D.

1891



REPORT.

In compliance with the request of the State Board of Health, I herewith present, as Sanitary Inspector, the following report:

SCHEDULE OF SUBJECTS.

- A—Location, geology, topography, climate and population.
- B—Streets and houses.
- C—Markets and manufactories.
- D—Public buildings and schools.
- E—Slaughter-houses and diseases of animals.
- F—Cemeteries.
- G—Refuse and garbage.
- H—Water-supply.
- I—Drainage and sewage.
- J—Public health laws and sanitary expenses.
- K—Vital Statistics.
- And a general summary.

A—LOCATION, GEOLOGY, TOPOGRAPHY, CLIMATE AND POPULATION.—The city of Camden is situated upon the east bank of the Delaware river, in the county of Camden. In contour it is elongated, extending north and south a distance of twenty-nine squares, east and west twelve squares, counting only the built-up portions of the city's extent. It is bounded on the north by the Delaware river and Cooper's creek, on the east by Cooper's creek and Haddon township, south by Haddon township and Newton creek, and west by the river Delaware. Its area is six and one-half square miles. Though its geological structure is slightly diversified, it in the main is represented by the sandy loam soil with underlying strata of clay and gravel.

The surface does not present any steep grades or elevations, and may be accepted as a typical, level-built city throughout, with a varying altitude from its tide-washed marshes to perhaps a mean height of twenty feet above tide-water.

The climate is mild and temperate, and in the main delightful and healthy.

The population includes representatives of nearly every nationality, but is mostly composed of the native-born element. The first four wards of this city are largely populated by a class of citizens—*i. e.*, merchants, manufacturers and mechanics—who, like the crows of West Jersey, “come home to roost,” while crossing the river daily in pursuit of their callings. The number of residents of Camden who have their business interests located in Philadelphia is perceptibly increasing. The admirable system of ferriage between the two cities, and the many advantages of a residence here to such business men, is having a marked effect upon the increase of population, especially in the better portions of the city. A fair estimate gives Camden a population of 45,000, as compared with the census returns of four years ago—41,658 (census 1880).

B—STREETS AND HOUSES.—The streets are of ample width throughout the city, with only a few scattered exceptions, and as a rule have right-angled intersections. There is such a natural and almost even grade everywhere in city limits, that grading of any consequence is required only in filling up marshy ground at certain points along the Delaware river, Cooper’s creek and a large tract of meadow and marsh lands in the Eighth ward, known as Line ditch or Little Newton creek. About sixty per cent. of the building-improved streets are paved, and about fifty per cent. of the remainder are curbed and guttered. Most of the paving laid is cobble-stone, which, however, is gradually giving way to a far superior paving, *i. e.*, Belgian block, or in some cases rubble-stone. Several of the finest thoroughfares are laid with asphalt block, which is certainly a cleanly and smooth pavement, but not considered so durable as the Belgian pave.

The city ordinance relating to the cleaning of streets requires that the work should be given to the lowest bidder, who annually contracts to do the work at a cost to the city yearly of from \$3,000 to \$4,000; the said cleaning having reference mainly to paved streets. This work is usually done at irregular intervals by workmen with scraping hoes, who collect the dirt into heaps for removal with carts. Some of the better-paved streets are sprinkled, and the dirt collected into rows by wagon-sweepers. Brooms are occasionally used. The superintendence of this work is done by the contractor, and, by the present

contractor, is done personally, which, to say the least, is a promise of good results.

The removal of ashes, garbage and slops is also a work done by contractors, who annually bid for the work at a cost usually of from \$2,500 to \$3,500. The collection to be made twice weekly, excepting in midsummer, when collections are made thrice weekly. The supervision of street work is a duty of the Sanitary Inspector, so far as relates to health measures, but is not rigorously enforced. (Refer to Schedule C—Refuse and Garbage.)

The houses of this city are mostly of the single family dwelling sort; but very few tenements of the multiple kind being found. The construction material, for the most part, is brick, with occasional stone or marble fronts. An ordinance defining building within city limits prohibits the building of frame houses in the upper six wards. And another ordinance provides for the election of a building inspector, and defines his duties, which, however, requires his supervision of the material used and the mechanical construction of buildings, rather than the important work of the sanitation of new buildings, which work is not provided for by any act of city council. This is a serious oversight, and should at once be corrected. While it may be important for an inspector to see that a wall or joist has a certain dimension, it is infinitely more so to insist upon a good sewage and drainage of new buildings, for which no ordinance or enactment provides. (Refer to Schedule I—Sewage and Drainage.)

The number of buildings is now estimated at about 9,000, or one building for every five inhabitants. The increase is represented by the permits issued by the city clerk during the months of April, May and June, which number one hundred and sixty-three, which permits frequently call for the erection of a number of buildings on a single permit issued. Thus it will be seen that several hundred buildings are erected annually without the supervision of a disinterested official, so far as relates to drainage and sewage, and this matter is left to the builder and his plumber, and is too frequently a matter of dollars and cents.

C—MARKETS AND MANUFACTORIES.—On account of the custom of selling meats, groceries and greens at small stores, there are but two market-houses in use in this city. The West Jersey Market is, in the main, a meat market, and receives its stock from a distance, with the exception of veal, of which about six calves are butchered weekly.

The sanitary condition of this building is good, is under-sewered and the offal and refuse immediately removed. The Federal Street Market contains a few meat stalls, but is largely occupied by farm-produce dealers. This building is well drained and fairly cleanly.

It might be well to mention here the existence of a sealer of weights and measures, whose duties, however, do not include the work of inspection of edibles, which important work is left *undone* and entirely unprovided for. We have no inspection of edibles or milk.

The manufactories embrace woolen, worsted and ironwork mills and the making of steel pens, soaps, chemicals, paper and oil-cloths. A few of the larger buildings, where the most workmen are employed, were inspected in order to learn their system of water-supply, drainage, etc., with the following results:

The woolen mills (300 employes) obtained drinking-water from deep-driven wells, and are well sewerred. Found water in no danger of contamination.

Esterbrook Pen Factory (300 employes) was found in excellent sanitary condition and especially well ventilated. City water-supply.

Starr's Iron Works (600 employes) is supplied with drinking-water from a large magnesia-limestone spring on the premises, about 100 feet distant from any building excepting one large privy-well, at seventy-five feet, which the superintendent agreed to move seventy-five feet farther distant from the spring. Drainage satisfactory.

My attention has especially been directed to the hide, fat and tallow-rendering establishments of Baxter's, at Sixth and Kaighn avenue, and Read's, at Second and Mickle, on account of an unpleasant odor arising, during the summer especially. I found Baxter's establishment in fair sanitary condition, excepting the system of surface-drainage employed. One street bordering his place is neither paved nor guttered, and cannot drain anything upon its surface; and although this place, with its twenty-five years' existence, has been carefully managed, this objectionable feature should be remedied by draining this place into the Kaighn avenue culvert.

Read's establishment is underdrained and only objectionable on account of the odor, which seems inseparable from such a calling. "An Abattoir and its Drain," as a part of this establishment, will be referred to under Schedule E, with especial reference to its drainage.

D—PUBLIC BUILDINGS AND SCHOOLS.—Of the public buildings, there are but four requiring special notice.

The City Hall is well sewered, and stands at the head of the Benson street sewer, and on the water-shed line between Cooper's creek and the Delaware river, with an altitude of eighteen feet above tide-water line. The sanitary defects found were principally in the water-closet arrangement of the prisoners' departments. Of the twelve cells on the first floor, each 6x12 feet dimensions, all were provided with water-closets, one in each separate cell. Of the twelve water-closets, only one was found to work satisfactorily; ten were very imperfect, in having become broken, rusty or otherwise disabled, and one closet-trap was choked, and the outflow was received upon the cell floor. All the closets were foul, and the emanating odors quite perceptible. The twelve basement cells were used principally as a lodging-room for tramps in winter; the cells contained only four or five closets that could be used at all, and they were also in a foul condition. The basement was also very damp and filthy.

The only remedy for this state of affairs in the prisoners' department, is to reduce the number of closets to a minimum and have them under the close and direct supervision of the janitor.

The Court House and County Jail occupy one and the same building. The principal sanitary defects found here have reference to the heating, ventilation, and the basement cell arrangement, water-closets and the handling of garbage. The twelve basement cells are stone-enclosed vaults, with a narrow door and grated window each, and built about five feet under ground, so arranged that one-half the number open into separate corridors, which are common receptacles for the prisoners at certain hours of the day. These corridors each contain a hydrant, bath-tub, water-closets, and a barrel-sized, galvanized garbage box, all of which were grouped at one end of each corridor. The sun rays cannot penetrate into these corridors, and the vaults are dark and damp as dungeons. At this time each cell or vault accommodates about three prisoners, or eighteen to a corridor, who, on escaping the noisome air of the cells, were obliged to breathe the gaseous emanations from the rusted and ill-working water-closet arrangement and the half-filled garbage boxes, which, while being emptied twice weekly, would have been less sour and disgusting to the smell if meantime they were furnished lids. But I think it barely possible for any plan to entirely relieve these unventilated cells and corridors of their noisome condition, excepting the one now proposed, "the removal of all prisoners from the basement to the upper floors,

on the completion of the proposed new county building." The ventilation of the building is very defective, on account of its association with this basement filth. And one of the three large heaters located in this basement is lodged on a level with and between the two rows of prisoners' vaults. The air to be heated and distributed to the offices and court rooms overhead is taken directly from the corridors, and is no doubt a contributing cause of complaint made by occupants of the upper rooms of noxious odors being very perceptible on first entering their rooms in the morning. This might be obviated, to a certain extent, by supplying this furnace, as the other two are supplied, with a box air-conductor; but this alone would not be sufficient, for the very reason that the court room and offices are too closely associated with the prisoners' apartments to be freed from their effluvia. And the proposed removal of the court and county officials to the adjoining new building is a necessity and a wise sanitary procedure, well calculated to abate this old-time nuisance of basement prisons in conjunction with public and, at times, crowded rooms overhead.

Attention was directed, by complaints, to the condition of the city's two largest halls. The first, Wildy's Hall, was found to be very defective in its water-closet arrangement, and Morgan's Hall had broken bell-traps under the streets. The promise of abatement of the respective nuisances was obtained in each of these cases.

The schools were closely inspected, and, for the sake of brevity, the result will here be given with reference only to the sanitary defects found. And as the water-supply for all the schools, excepting two in the Eighth ward, is obtained from the city reservoir, the only fact that need be mentioned in connection with this hydrant-water, is the universal use of bell-pipes to receive the waste-water, &c., which is certainly not sufficient, in the absence of the running drain-traps.

FIRST DISTRICT.—(1) *Cooper School*.—The underdrainage or sewerage is flushed by roof and yard rain-waters, and is fairly well arranged, and is deficient only in not having a small flush-tank as a protection in a dry season.

(2) *North-East School*.—Heated by steam through pipes well arranged. This school is the only one in the city thus heated, and is decidedly superior to all others. In fact, the portable heaters used in the schools are not provided with air-box conductors, and receive the air to be heated and distributed from the cellar, which, in some of the schools, is very deleterious, on account of the dampness and poorly ventilated condition of the cellar air.

The principal defect found here is the imperfect underdraining of the large privy-well in the yard, mainly on account of the drain-pipes entering the well too far above its bottom, and thus allowing a retention of from 12 to 15 inches of fecal matter in the well at all times.

(3) *George Genge School*.—Light; ample, but not well-directed in two of the rooms.

Of the two large privy-wells in the yard, one was found partially filled with board and planking debris and very imperfectly underdrained.

SECOND DISTRICT.—(4) *E. A. Stevens' School*.—This cellar floor is not properly cemented, and objectionable on account of one of the four heaters in the cellar being a *portable*, and supplied with air directly from above the floor.

(5) *Central School*.—Heat ample, and supplied by four portable heaters; the cellar air, however, is not as objectionable as the preceding. Cellar well cemented.

THIRD DISTRICT.—(6) *Richard Fetter's School*.—On account of privy-well in yard not having sewer connection, and the presence of a fecal odor in the building mornings on opening, there is good reason for believing this drain not properly trapped. Indeed, the only evidence of any trapping of this underdrain was in the finding of bell-traps under hydrants in yard, and the traps of two water-closets in building. The rain-water conductors run into the drains and flushed them, and received the washbasin waste-water, also; each not supplied with any trapping, and it is no doubt due to this fact that the noxious odors are detected in the building. A running trap between the building and culvert is essential here, in addition to bell-trapping and S bending of all waste-water pipes.

(7) *Isaac S. Mulford School*.—Similar to Fetter's school, excepting odors in building not so easily perceived and yard not well graded. Broken bell-traps in both schools repaired during vacation.

(8) *Kaighn School*.—Light and heat sufficient; ventilation not sufficient. Odors prevalent in this building at times, owing to bad drainage. The two hydrant drains in yard were found choked. The water-closet in building not well flushed, and the drain-pipe in yard-well about one foot above its bottom. This drain needs overhauling.

FOURTH DISTRICT.—(9) *Liberty School*.—Is in fair sanitary condition, and its method of underdrainage is worthy of adoption by all the other schools, especially in the construction of the yard-well,

which really is the only properly-constructed privy-well in the yards of the city schools, it being a trough closet. Unfortunately, however, this drainage is run into one of the worst culvert systems in this city. *Vide* Tenth street culvert.

FIFTH DISTRICT—(10) *John W. Mickle School*.—The supply of water for this school has heretofore been taken from the dead-level of a water-pipe, but is now being corrected. A peculiar feature of the underdrainage of this building is that all drains are conducted into a large cesspool and privy-well in the back yard, which in turn is cleansed only every few years.

(11) *Central Avenue School*.—This is a small school of two rooms situated in the Eighth ward, and is quite primitive in its appointments. Light ample, though not well directed; heat, by ordinary coal stoves in each room; ventilation, by means of windows and doors only. The water-supply is taken from a pump-well in rear of building, which well is only fifteen feet distant from two privy-wells, which privies are only six feet deep, brick lined, but planted in such loose soil as to render their close proximity to the water-well very dangerous. The privies are cleansed every few years, but no method of cleansing can save the water from contamination.

SIXTH DISTRICT—(12) *Mount Vernon School*.—Light is sufficient, but not well directed. Heat obtained from two large brick heaters in cellar, is ample but is unwholesome for the reason that the heater air is obtained directly from the cellar, in which from January 1st to April 15th, this year, there was nearly two feet of water; often sufficient to put out the fires in the heaters. There are no water-closets in this building, and the two large privy-wells in the yard are underdrained into the Broadway culvert. This drain should be utilized for the drainage of the cellar of water, and it is possible nothing short of a culvert on Mount Vernon street will relieve this school of its very bad drainage, for this street is unpaved and the gutters are very filthy and offensive; and further, the culvert is now too far distant (half square) for an ordinary drain to keep the cellar dry, and run off all waste waters with the privy debris and other waters of the premises.

(13) *Ferry Avenue School*.—This school, like primitive Central avenue school, is beyond the limits of city water-supply and the culvert systems. Light good; ventilation by window and door only; heat obtained from coal stoves in each room; water is supplied from a pump-well eighteen feet deep in rear yard, about thirty-five feet

distant from nearest privy-well. The water tastes very badly and is charged with visible organic debris. The odor of the water was far worse than the taste, *i. e.*, nauseous. This place is all surface-drained, and the four box-frame privy-wells in yard were in foul condition. The cellar is poorly ventilated and needed cleansing.

The ventilation of the schools, when not mentioned in above report, is by means of flues and windows. The flues have communication with rooms by means of small registers, and are not by any means reliable without the aid of some force in displacing the cold air in them by an upward current; and the best force is conceded to be steam when steam is employed for heating purposes. There is but one school thus heated in Camden, and by its efficiency and superiority is worthy of adoption in all the other large schools.

Another ill-advised feature to be met with in our schools is the custom of rough plastering or sanding the walls of rooms and corridors. It is a means of arresting dust and dirt, and far inferior in cleanliness and purity to the smooth or whitewashed walls.

A reference to the sectional report, as just given, will show, however, that the most sanitary defects are found in the drainage of schools. A radical reconstruction in conformity with the principles of sanitary drainage is urgently needed. Here, even more important than in the drainage of private houses, are the services of a sanitary engineer, or, at least, a skilled sanitary inspector, needed in supervising the building of all drains. The importance of sanitary plumbing need not be discussed here, but the importance of supervision must be emphasized, for the double reason of insuring good work to the builder and the public, and protecting the honest and really skillful plumber from unjust and unworkmanlike competition.

The number of children of a schoolable age is thirteen thousand seven hundred and seventy (census 1884), nearly all of whom are accommodated in our schools; and some of the larger schools are capable of seating nearly one thousand pupils.

In addition to the above, the inspection included the West Jersey Orphanage (18 inmates), and the Children's Home (25 inmates), and the result was favorable in each case, excepting a large drain, in the yard of the Home, emptying into the playground of the children, contiguous to the building, all the refuse and waste-water of the building. It was at once agreed to remedy this defect, by extending the drain into a cesspool farther from the building.

E—SLAUGHTER-HOUSES AND DISEASES OF ANIMALS.—An ordinance relating to the slaughtering of animals was enacted by the city council June 3d, 1850, which prohibited the killing of cattle, sheep, swine and other animals within city limits; prohibiting, also, the depositing of entrails within city limits, punishable by fine, imprisonment, or both. The section of this ordinance relating to killing of animals is a dead-letter. I have visited and inspected eight large slaughter-houses, where killing, &c., is done without intermission, winter and summer, and in this city there are about twelve to fifteen more where butchering is done in winter only. Of the eight inspected, five were found well under-sewered, two under-drained imperfectly, and one surface-drained into a large cesspool, which, however, is frequently cleansed. All of them were supplied with city water, excepting two; one in suburbs with pump-water, and one in city with driven-well. As to the method of the disposal of animal remains, the hides, fat, bones, &c., is sold to the tallow renderers, and the offal carted daily to the country customers, for use as hog feed or mixed in compost heaps. The summer butchering includes cattle, sheep and hogs (and in one establishment, I am loath to include, sick cows and bob-veal). An abattoir is a great city need.

The diseases of animals is a subject which receives the studious attention of the local State veterinary inspector.

Dead animals are usually carted outside of city limits and buried, or sold to the bone-boilers. The small animals are, however, the most troublesome, and dogs and cats, or chickens are frequently found upon vacant lots or alleyways, and require burial under the direction of our sanitary committee.

F—CEMETERIES.—There are but two burial grounds used within city limits, *i. e.* Camden cemetery, in the Seventh ward, at a safe distance from the built-up portions of the city, and Evergreen cemetery, in the eastern section of the Eighth ward, and well isolated. There are other and smaller burial grounds connected with a few churches in the city, but are not now used for new burials, and a finely-kept ground adjoining the Camden cemetery, known as the Friends' burial ground.

Both cemeteries are well taken care of by the keepers; the graves are six to seven feet deep, excepting in the section where the city poor are buried, where a depth of four to five feet is considered sufficient.

Graves are sometimes re-opened for new burials in them, but as a rule the graves are never disturbed where the occupants have died of a contagious or infectious disease.

G—REFUSE AND GARBAGE.—The disposal of house refuse is not governed by any specific ordinance, for the subject-matter is mentioned only in the general sanitary or Board of Health ordinance, wherein the refuse and garbage is prohibited by fine from being deposited on vacant lots, streets and alleyways.

It is customary, annually, for the street committee of city council to contract to the lowest bidder, the work of collecting the ashes, refuse and garbage. The contract price this year, is \$2,887.50. The contract stipulations are very stringent, and require the ashes and garbage to be collected separately, and as often as twice weekly, from about September 15th to June 30th, and three times weekly during the summer season. The stipulation in regard to separate collection, is disregarded, although the contractor states his willingness to collect separately if the people will present the material in that shape, he collects as he finds them, *mixed* in the ash boxes near the curb of residences, and dumps the collection, as stipulated again by contract, either along the river front for filling up to grade, or, as now ordered, on a lot of ground owned by the city, that is bounded by Cooper's creek, Market street and the Pennsylvania railroad, within city limits, and near occupied streets. This ground is about four to five acres in extent, and is entirely under water at high-tide, and will be more fully described under Schedule I (Federal street culvert).

The slop-gatherers are a numerous class of small farmers and pig raisers in the suburbs, who, with nearly every description of vehicle from the barrow to the close box wagon, almost daily are seen on our streets collecting slops. These scavengers are not governed by any enacted rules or laws, and probably not sufficiently under control of the contractor to do their work properly, and, as a matter of course, the rejected slops are carted off in the ashes as described, but much of it finds its way to the hog-pens. Here our ordinances are again defective, and nothing short of a specific enactment can so regulate this work as to make it effective, and save our undergrade lots from a filling-up with garbage mixed with ashes.

Then, again, there are certain portions of the city never visited by the gathering carts, *i. e.*, portions of the Seventh ward, and a greater

part of the Eighth ward, where the unpaved streets and undergrade lots are the recipients of ashes, and, in not a few cases, of garbage. In these portions of the city, it becomes a question of the greatest importance, "How to dispose of the refuse and garbage?" The drainage is all surface, and too frequently the undergrade lots and streets are converted into shallow cesspools by this debris.

H—WATER-SUPPLY.—The water-supply of Camden is taken directly from the river Delaware at a point about one mile north of Cooper's creek. The river opposite the water-works is divided into two channels by Treaty island, the smaller channel being on the New Jersey side. This channel is the one from which the supply is taken, and, geographically considered, is superior to any other within a radius of ten or twelve miles. A bend in the river and the favorable location of the island favors the maintenance of the real channel on the western or Pennsylvania side of the river, which, by its accommodating the greater body of tide-water, carries with it also the heavy sewage matter received from both Philadelphia and Camden.

The maximum depth of the Jersey channel is thirty-five feet; width, half mile; length, one and one-third miles; and the only culverts that may be said to empty into the course of this channel, are the two short culverts, State street and North Second street systems, and the North Front street culvert, and Federal street *via* Cooper's creek, as the main culvert terminations. The dilution which this comparatively small amount of sewage receives may be sufficient to relieve any apprehension of danger from this source. But as the channel is a part of the river proper, the river water must receive our special investigation.

The Delaware river receives its water from such a large and diversified water-shed, that its chemical analysis is of comparatively little importance, for the very reason that it has no specific mineral or inorganic taint. The analysis of *Cooper's creek* water shows it to have some of the magnesia-limestone qualities of Schuylkill water; and as a tributary of our water-channel, the analysis by "Reuben Haines, 1884," is here given :

Lime.....	0.55
Magnesia.....	0.49
Ac. Sulph.....	0.64
Total Solids.....	3.75
Total Hardness.....	2.60 (Eng. Deg.) in 100,000

And the usual amount of chlorides and nitrates natural to flowing streams.

The same conclusions as to a microscopic analysis, however, cannot apply; for the very reason that the Delaware river between Camden and Philadelphia is made the common receptacle of the sewage of one million people, and the debris of many hundreds of manufactories.

During the past winter our water was unusually cloudy and dirty, and in the cleansing of the basin this spring a removal of over four thousand cubic feet of sediment was effected by washing the bottom of the basin or reservoir. It was prior to this cleansing that the following results of microscopic analysis of our water were obtained.

The water was received directly from a hydrant, and the settlings and filterings under the microscope was found to consist mainly of ferns, micrococci, amoeba, and the many varieties of rotifera, with others not specially noted. The vegetable algæ and rhizopods were also abundant; all of which were shown to be of normal cell-color and activity. In addition to the living forms enumerated, there were found fragmentary parts of the eutomostacæ and flocculent deposits, no doubt the remains of animalecular and vegetable debris, and sand in a state of fine subdivision.

The question naturally arises, what becomes of the immense quantity of sewage and filth that is constantly thrown into the river? The natural processes of conversion, and especially oxidation, in so large a body of constantly-moving water, may, under favorable circumstances, be sufficient to render the pollution innocuous; but there are times when these processes are more or less suspended, as for instance in midwinter, when the air and sunlight are excluded by a coating of ice, or, perchance, by filth deposited too close to the receiving end of our water-pipe. Which dangers, however, are preventable by the stringent application of a better legislation than Camden has had heretofore in regard to the protection of this channel.

The water-works are well situated, and are defective only in the position of the receiving end of the water-pipe, which is almost flush with the end of the wharf, and visible at low tides.

The works are provided with two pumping-engines, one with a capacity of 5,000,000 gallons daily, and a reserve engine of 2,500,000 gallons capacity. The reservoir is of a size sufficient to contain 4,500,000 gallons. The average daily consumption of water for the year 1883 was 3,100,000.

The water-pipes leading into the city are well distributed and reach every part except portions of the Seventh ward and a greater part of the Eighth ward.

The number of dwellings and stores supplied is.....	7,594
Manufactories.....	35
Railroad depots.....	4
<hr/>	
Total buildings.....	7,638

And it is estimated that out of a population of 45,000, 38,000 constantly use the city water, and of the remainder a large majority as constantly use well or pump-water. The number of houses not supplied with reservoir-water is about 1,300.

Before the present water-supply system was introduced, it was the custom of the then city authorities to assist the residents in building pump-wells near the curb-line of public streets, which resulted in the planting of such wells in almost every part of the city. A great many of these wells have been filled up since the introduction of the Delaware water, but there remain a full half hundred still in constant use, and two-thirds of this number are in the upper four wards. Many of these wells should be discontinued on account of their proximity to culvert inlets. In some cases they are located on unpaved or otherwise badly-drained streets.

The parts of the Seventh and Eighth wards that are the least well drained are where the pump-well system of water-supply is mostly employed, but as the reservoir water-pipes are being gradually extended into these wards, a few facts only will be cited:

The Seventh ward east of the Camden and Atlantic Railroad is not supplied with city water, and it is the custom of the residents to plant a cucumber pump in a dug well varying in depth from twelve to twenty-five feet, in some convenient place in the yard, without a sufficient regard to the close proximity of a privy-well or surface-pool of stagnant water. In one case we found an interval of only six feet between the pump and privy-well, and many others varied the intervening distances from six feet to about fifty feet, and the users of these wells are frequently driven, after heavy rains, to borrow water from a neighbor's pump, on account of the foul odor and taste of water in their own wells. The population of this district is about six hundred.

Sycamore street, on the west of the railroad, is the only one long street not supplied with city water, but the residents here have access

to hydrants on neighboring streets, only a few being obliged to use pump-water; these few pumps are no improvement over those found east of the railroad. Hog alley is a small and horribly dirty street, contiguous to Sycamore street, above Seventh, and was the starting point of the small-pox epidemic here in 1881. The streets of this district are neither paved nor graded.

The pump-well district of the Eighth ward is but a repetition of the Seventh ward, with the exception of a few localities where the driven well has been introduced, which is far superior to the open well, from the fact that an upper strata of clay of variable thickness is pierced by the pipe before the water-vein is considered tapped. It would prove too lengthy an account to attempt a detailed description of the one hundred and fifty wells in this ward; suffice it to say, "that a depth of from twelve to forty feet, with a siding of brick or board, fairly describes one of these wells;" and a taste of water from most of them is nauseous and unwholesome to any one not accustomed to it. A few of the wells along the line ditch are very shallow, in fact, supply surface-water only. "A cucumber pump stuck in a hole in the ground," fairly describes the situation. There are a few of the old-time pumps in this district which supply a fairly good water, one of them, however, on Miller street, below Central avenue, is planted in low grade, and, after a prolonged rain, is filled by surface-water flowing into the top of the well, standing, as it then does, in a pool of water. There are about four thousand people who use pump-water in this, the pump-well district, of the Eighth ward; the city water pipes only supplying Broadway and a few contiguous streets.

In summing up briefly, it is well to note the existence of certain factors in our water-supply which, in the event of specific contagium, might render the best sanitary precautions abortive. And nothing short of a properly organized Board of Health and efficient inspectors can be relied upon for a safeguard against any threatening or existing zymotic diseases.

I—DRAINAGE AND SEWAGE.—The topography of Camden is favorable in the main to good drainage, when proper means are employed to effect it. The most favorable inclines for drainage are from the water-shed line, as represented in accompanying chart and marked thus X X X X; in which directions nearly all of the street culverts are laid, with the exception of a few north and south street culverts. The

water-shed line has a mean altitude of eighteen feet above tide-water, the inclines running toward the river, Cooper's creek, and line ditch; the outlet of the Tenth street culvert, as represented on the chart, however, is two and a-half feet above tide-water. The streets running north and south have favorable inclines for short distances only, and, therefore, cannot be utilized except for draining into east and west street culverts.

For convenience of description the culverts will be divided into ten systems, and, for the sake of brevity, the principal defects alone will be described.

1st. The North Second street culvert has a length of 1,364 feet, and is defective only in having its four inlets situated at the intersections of unpaved streets.

2d. The North Front street sewer is 6,580 feet in length, and through its six-foot outlet it sewers the built-up portions of the city north of the Camden and Atlantic Railroad, and most of the water-shed line, excepting only that portion drained by the Second street culvert. Through the man-holes, near the distal ends of this culvert, where the streets were not paved, large quantities of sand were found to nearly fill the sewer's caliber, carried there through the inlets from the unpaved streets, suggesting at once the impropriety of culverting unpaved streets. In other respects this culvert is efficient, and drains a fair percentage of houses along its course.

3d. The large Cooper street culvert drains all the territory north of that street to the railroad, and east to a little beyond the water-shed line, as per chart. This sewer is the largest and best in the city, and has a length of 21,653 feet. The portion that extends north (on Front and Second streets) of this sewer is, however, too nearly on a dead level to prevent the solid debris from accumulation on the sewer bottoms, and one place particularly, at Second and Elm streets, the culvert has the appearance of gradually filling up. The only remedy in preventing the closing up of this important culvert is an extension of the Pearl street sewer into the river, which, as per chart, is now shown to extend to within one-half square of it. The rapid and valuable improvements being made in this part of the city, strongly call for this improvement. This sewer is the means of underdraining more buildings than any other in the city. One other defect may be mentioned in this system, *i. e.*, the great depth of the slip into which this culvert opens; a reference to the chart will show

the extension of wharves on both sides of this slip, and at low tide about one-third of this slip-bottom is exposed to the air, which is more or less covered with sewer filth about two hours each day, in fact, until the rising of the tide. The fecal odors at low tide are very perceptible.

4th. The Arch-Federal street sewer is a most excellent one, excepting the one error of discharging the Federal street end into a large cesspool of a square's length before reaching the tide-water of Cooper's creek. The extent of this system is 14,653 feet, and about 4,000 feet of this length is drained east on Federal street into a ditch alongside of the street, and along the border of a four-acre lot of ground owned by the city, and bounded by Pennsylvania Railroad on the north, Cooper's creek east and Federal street south. This ground is marshy and covered with water every tide, and although this ditch of a square's length is supposed to have a sufficient grade to carry off this sewer debris, it is nothing but a cesspool at its best. Each tide on rising distributes the ditch contents all over this marsh and converts it into a reeking and pestilential pest-hole. Fortunately there are but few buildings in the immediate neighborhood, but the adjoining street is a main thoroughfare and largely traveled, and the best interests of our citizens demand a correction of this, the worst sanitary defect in the city of Camden. The city owns this marsh, and it is being gradually filled up to grade with the ash collectors' debris, beginning at a point farthest from the creek and protecting the encroached-upon trench or ditch with upright planking. The sanitary condition of this neighborhood is also seriously compromised by an open gutter extending along the north side of the Amboy Railroad, and receiving in its course the surface-drainage, including sewage from the premises of about sixty houses, located near the railroad tracks. This condition is especially noticeable in the rear of California row; this row, of about a dozen houses, is the worst of the lot, and could readily be improved by draining into Federal street culvert; all alike, however, should be restricted in the custom of using this gutter for the purposes of a sewer. In all other respects the Arch-Federal street culvert system is in good condition.

5th. The Benson street system of 19,035 feet of culverting was found in excellent condition, excepting that part located on Mickle street, and from thence on Second street to the Benson street main. On account of complaints received from residents on these streets, the

city surveyor and myself endeavored to make a close investigation, which resulted in locating the cause of the complaint in the culvert bend at Second and Mickle streets. The sewer was opened, and within a culvert length of thirty feet, no less than five water and gas-pipes were found to pass through the caliber of the sewer and seriously obstruct it. In fact, the sewer was nearly full of sewage and dirt, the location of these water and gas-pipes favoring the lodging of the debris at this point, sufficient, after a heavy rain, to totally obstruct it, as was verified during the past spring, while the obstructed water was forced through the inlets and low manholes in the street above obstruction. I have examined cellars along Mickle street that bore twenty-inch water marks, and was informed that the heavier rains usually filled the cellars to that depth with water, some of it, no doubt, due to the obstructed culvert, but in part due, also, to the character of the gravel, which is made ground, and at Second and Mickle streets only two and a-half feet above high tide-water. The tide-water enters, or at least obstructs, the culvert flow, so that it is normally filled, at high tide, up Mickle street to Third. It is very evident that gas and water-pipe obstructions, under such circumstances, must prove a most serious defect. And in this instance the culvert obstruction was promptly removed. Other instances, however, of culvert obstructions of a like character have come under my notice, as, for instance, a water-pipe of six-inch dimension running through Second street sewer, between Mickle and Stephens, one of same dimensions at Third and Mickle streets, and a large gas main through a culvert near the gas works. It is very evident that our municipal laws are very defective in thus allowing willful obstructions to be placed in the culverts, and we need an ordinance, specific in its terms, relating to the laying of all gas, water and drain pipes and the building of culverts; giving the culvert the right of way in a question of grade at all times, and never allowing the tapping of a sewer or culvert, excepting by special permit.

6th. The Clinton street culvert of 14,390 feet length and five feet outlet, is in excellent working condition. It is proposed to divert 5,000 feet of the Benson culvert system to the Clinton, on account of the more favorable location of the Clinton sewer for draining this district east of Fifth street. This is a wise and practical proceeding, and is now being effected by changing the Washington street culvert grade, in order to connect at Fifth and Washington the Clinton and

other street culverts east of Fifth street, in this locality. This sewer is also now being extended 400 feet towards the river wharf lines, which is a distance of about 1,000 feet from the shore, with an intervening marsh.

7th. Division street culvert system has a length of 11,775 feet. About ninety per cent. of this length is laid on east and west streets, and therefore of good grades. There is a few inches of sand found in culvert bottom, owing to some of the streets being unpaved. There are comparatively fewer houses and privy-wells underdrained in this district than any other of the described systems.

8th. The Walnut street system is also a good east and west grade sewer, and has a length of 7,220 feet. This culvert is extended well towards the exterior wharf line, and in this respect is far superior to the Division street sewer. There are also more houses underdrained in this district, but the sewer is found in equally as good a condition.

9th. The Kaighn avenue system has a length of 6,085 feet, and is in excellent condition, excepting that part west of Second street, which is run too nearly on a dead level to be kept clear of settlements. A deposit here of about ten inches was found in a sewer caliber of four feet.

10th. The Tenth street culvert, as traced on the accompanying chart, is a large underdrain for the streets of that section of the Seventh ward. There is but one building that drains into it, *i. e.*, the Liberty school. None of the streets under which it is laid are paved, the man-holes are deeply covered with dirt, and many of the inlets are too high above the gutters to catch even the rain-fall. And well it is that this culvert is not a sewage drain, for the reason that its outlet is into an open ditch at Tenth and Kaighn avenue, which traverses line ditch for a mile before reaching the river tide-water. The altitude of this point is three and a-half feet above tide-water, and separated from it by two flood gates located between the sewer outlet and the river. The culvert ground east of the railroad is about twelve feet under grade and about one and a-half squares in extent; the undergrade ground is owned by private parties, for whose benefit the culvert was built with an open end, to favor the drainage of this section, but the ground is too low grade. As a result two large ponds of water are constantly present, and by their receiving all the surface drainage of the neighborhood are really converted into large cesspools, similar in some respects to the cesspool outlet of the same sewer. This culvert system includes

a length of 11,092 feet, of two, three and four feet culverting, and is really under the circumstances a useless waste of material.

There are in this city three other short culvert systems: One at State street bridge of 1,290 feet; Ferry road and Jackson street, 4,415 feet, and a sewer on Jefferson street of 1,923 feet length. These sewers are in fair condition, excepting the Jackson street branch, which carries more sand than an effective sewer should, no doubt owing to the storm-water washings of the unpaved streets.

There is a total length of 128,492 feet of culverts traversing the streets, which is under the supervision of the city surveyor, so far as relates to the mechanical construction of them. In case of obstruction or inlet choking, the street supervisor is the one to apply the remedy, under the direction of the street committee of city council.

The sewer defects as recorded, are well known to our city officials, and the reason given for their non-correction is "short culvert appropriations." The city is building faster than the culverts can be laid and repaired, under the present so-called short appropriations, which, in true economical sense, should not be the case. And one of the most reprehensible defects in our system of culverts is the presence of water and gas-pipes in them, running through the sewer calibers as though obstruction were of no consequence. This is an error that a short appropriations plea will not defend, and an ordinance defining the grade lines of all pipes and culverts, giving the right of way to the sewage and drain pipes or culverts, is a necessary and essential legislative act in remedying this easily-corrected defect. On general principles an obstructed sewer or drain-pipe is worse than none at all.

In regard to house and lot drainage, we find there is no supervision provided therefor, excepting only when complaint is made to our local sanitary committee or its inspectors. The drainage of new or old buildings is entirely depending for efficiency on the owner or his plumber, and is too frequently a matter of dollars and cents. Drain-pipes are frequently laid by common laborers who do not profess to know what a drain-trap means, and I have become acquainted with a number of cases where house and privy-well drains have been laid without any trapping at all.

The necessity for a close and constant supervision of all work of this kind is so obvious that the Legislature has provided therefor in a special law applying to all cities that have Boards of Health formed under the State law, which this city has not.

The number of cases where houses and lots are badly drained is so numerous that an attempt at details will not be made, excepting two instances of lot drainage. First, of a lot bounded by Second, Washington, Third and Berkley streets, is two to three feet under grade, only excepting the street fronts. This lot is built upon on its four sides, and is traversed by very narrow alleyways (three feet); and a large percentum of the residents are in the habit of dumping their kitchen refuse in these alleyways and in the rear of their lots, converting the middle of the square into a huge compost heap, sour, rank and very unwholesome. The sanitary committee have long endeavored to suppress this nuisance, but without success; and the reason given by one of the committee is characteristic, "No funds to proceed in the matter." (Refer to Schedule J.) Another undrained lot, at Second and Mechanic, is in a similar condition, and the sanitary committee here have wisely ordered a sewer drain, to correct this evil and run the stagnant and filthy water through it into the Kaighn avenue culvert. There are numerous lots in this section whose owners should be compelled to fill up to grade, or connect with the culvert drain.

One other important matter under this heading, is the undrained privy-wells in all parts of the city. I cannot give in full detail the number and location of such wells, and therefore will give only the system of cleansing employed. Privy-wells are as a rule declared nuisances by our sanitary committee when complained of and found overflowing or filled to within six inches of top, and are abated as such, either by owner on order, or by city at owner's expense. The ordinance rules restrict the cleaning of wells before 11 P. M. by the open method, but allows the odorless excavating apparatus to work at any time during working hours. The privy refuse is all taken beyond the city limits, and much of it used in compost heaps and manures in various ways by farmers and truckers.

J—PUBLIC HEALTH LAWS AND EXPENSES.—The Board of Health of the city of Camden is governed by an ordinance, passed May 7th, 1872, with supplements, March 27th, 1879, and an additional ordinance on the relations of the Inspector to Board, mainly as to his clerical duties, and of no special importance.

BOARD OF HEALTH ORDINANCE.

Enacted May 7th, 1872.

[This ordinance is too lengthy to copy verbatim, since much of it has become a dead-letter, and it will, therefore, be presented in sections in as concise form as possible, and mainly for the purpose of showing its defects.]

Section 1 ordains that five members of city council shall annually be appointed by the president of city council to constitute a Board of Health.

Section 2 provides that a vacancy be filled by city council.

Section 3 ordains that the Board shall meet at such times and places as they may deem proper, and they shall keep a journal of proceedings. They shall have power and it shall be their duty—

(1). To inquire into and inspect all nuisances prejudicial to health, and abate the same in any way deemed expedient.

(2). To detain and examine any persons suspected of carrying any pestilential or infectious disease from an infected place.

(3, 4, 6). Provide for the removal of travelers or residents to hospital, when removal is necessary for the preservation of the public health.

(5). Remove or destroy all furniture that may be tainted with pestilential disease.

(7). Clean, abate or remove all nauseous, offensive or unwholesome matters detrimental to health.

(8). Persons disregarding rule 7, after due notification by the Board, are liable to a fine of fifty dollars.

Sections 4 and 5 ordain that any person who shall deposit filth of any description upon the streets, lots, etc., of the city, shall be liable to a fine of ten dollars.

Sections 6 and 7 provide for the abatal of nuisances by the city authorities at the expense of owner or occupant of such premises, when necessary, and a fine of ten dollars against any owner allowing his premises to remain a nuisance.

Section 8, the cost of abatal of nuisances by city to be collected by the city solicitor.

Sections 9, 10, 11, repealed by the ordinance supplements enacted March 27th, 1879, (to which refer in this report.)

Section 12, employment of nurses in the hospital.

Sections 13 and 14 ordain that decomposed or offensive materials shall not be landed by any ship or vessel until a permit is granted by the Board of Health, under a penalty of one hundred dollars fine. Also gives power to Board, in quarantining all vessels or people on board, in cases of suspected infection of pestilential diseases, &c.

Section 15, a suspected infectious dead body cannot be brought into city without a Board of Health permit.

Section 16, all infectious or pestilential diseases in city must be reported to Board, under penalty of ten dollars.

Sections 17 and 18 fine any person practicing inoculation of small-pox, and also person inoculated, &c.

Sections 19 and 20 relate to the necessary isolation measures to be taken by the Board in infectious diseases, and fine all persons who refuse or neglect to comply with the Board of Health's precautions.

Section 21, precautions to be taken in all contagious or infectious diseases.

Sections 22 and 23 define the duties of physicians or coroners in granting death certificates.

Section 24 not in force.

Section 25 prohibits removal of buried bodies between May 1st to October 1st, without a Board of Health permit; penalty, twenty-five dollars.

Section 26 ordains that all persons practicing midwifery, or, in case of non-attendance of such, the parents, shall report each birth return in full (monthly), or be fined five dollars for each offense.

Sections 27 and 28 prohibit any bone-boiling establishment, compost manufactory or depository of dead animals within city limits, and pronounce it unlawful for any person or persons to possess deposit places for pondrette or privy filth within city limits; penalty, one hundred dollars to two hundred and fifty dollars fine.

Section 29 fines any person for depositing sink or privy filth in any public place.

Section 30 a dead-letter section.

Section 31, any or all persons obstructing the work of the Board of Health shall be fined fifty dollars.

Section 32 provides for the recovery of all fines under this ordinance in an action for debt, &c., or an imprisonment for a term not exceeding ten days.

[Total length, thirty-two sections.]

An important supplement to the above ordinance, enacted March 27th, 1879, after defining the duties of magistrates in imposing, collecting and transferring fines to city treasurer, &c., provides in its

Section II. That the supervisor of highways shall act as inspector of the Board of Health, and his duty shall be to inspect all nuisances for report to the Board, and examine and report, within twenty-four hours, upon all complaints made to the Board, and shall serve all notices of the Board upon offending parties, and shall, at the expiration of such notices of abatement of nuisances, re-examine premises and make a second report to the Board for further action. He shall also examine all cesspools or privy-wells complained of, and, in case the city is obliged to abate such nuisances, shall take measurements of the same for use of the Board. And he shall see that all special orders of the Board relating to street cleaning and garbage collecting are complied with, and shall receive for compensation one hundred and fifty dollars annually, to be paid out of sanitary committee appropriations.

An ordinance enacted June 12th, 1884, ordains that the inspector shall also be the clerk of the Board of Health.

According to these ordinances and supplements our Board of Health is not constituted in accord with the intent of our present State laws. The members, as appointed from city council, may be out of their element entirely as sanitarians, and the annual re-organization of the Board is but another factor of disability. The appointed members, as merchants, mechanics or manufacturers, may not be in a position to refuse an appointment upon such a Board of Health, and yet, as members of city council, they do accept such a position with good-natured acquiescence, let the result be what it may. The present Board of Health is frequently called by the chairman, Mr. Bourquin, before he obtains a quorum, and when it does meet it is, probably, for the sole purpose of indorsing the actions of its worthy chairman, who has ever taken great interest in sanitary affairs, but who is not efficiently well assisted by the entire Board, or backed by the necessary legislation to make his work effective and satisfactory.

The inspector of the present Board is street supervisor (salary, \$1,000 per annum), health inspector and clerk of the Board (salary, \$150 per annum), and can't be expected to be more than he is, *i. e.*, street supervisor.

The inspector's report gives the number of nuisances ordered abated as forty-eight, from June 1st to September 1st, 1884. Of this number thirty were privy-well overflows and the balance defective surface-drainage. About thirty-five nuisances were abated by owners, as ordered, and a few abated at city's expense, with about eight or nine remaining unabated.

The annual appropriations for this, the Board of Health work, is \$2,000, out of which \$1,600 is paid the Camden Dispensary (for medicine and medical attendance to the poor), \$150 is paid to the inspector as a yearly salary, leaving a balance of \$250 for the work of the sanitary committee, or Board of Health, for a whole year. This, as might be expected, is soon exhausted, and, as a result, the contemplated sanitary work is suspended. Much of the sanitary work of the city is left undone for this very reason, and under such circumstances the Board shares the responsibility of ineffective sanitary work with the city council and its present defective and dead-letter ordinances.

There are a few sections of the Board of Health ordinance that are really worthy of adoption in a modified form, but so much of the ordinance has become obsolete that all of it may be said to have out-lived its usefulness.

Camden, with its 45,000 inhabitants, may be said to have no Board of Health, as Boards are now constituted under the present State laws. Nor can it be said that there are any definite sanitary provisions or enactments that are worthy of being called health laws. A re-organization of our entire sanitary legislation is urgently needed, and if this warning be disregarded let the responsibility be placed where it belongs.

K—VITAL STATISTICS.—Camden has been remarkably free from epidemic diseases for the past year, excepting the mild prevalence of measles, pertussis, and some scarlatina.

In examining the statistic records as kept by the city clerk, I find therein a record of reports as received, without any attempt at tabulation, and defective in the matter of birth returns.

On August 26th, the following reports were tabulated from the record books, for June, July and August :

June, 1884—	
Births.....	60
Deaths.....	87
Zymotic disease deaths.....	20

July, 1884—

Births.....	50
Deaths	103
Zymotic disease deaths	19

August, 1884, (prior to 26th)—

Births.....	5
Deaths.....	79
Zymotic disease deaths	10

The birth returns received in each month for registration, differ very materially from the records as quoted. Thus, in June were received seventy-three returns; July, forty-six, and August, eighty-seven. This disparity is owing, no doubt, to the custom of physicians in sending in their reports when convenient; with some it may be once a month, others, three months, etc. And I have good reason for believing that a few are guilty of never reporting a birth.

An effort was made in June last to enlist the services of physicians and others in their making more prompt returns, by the mailing to each of a copy of the State law and a circular, which had the effect of slightly swelling the list of returns, but not by any means of making them satisfactory or complete.

Excepting the birth returns, the statistic returns are complete, and are made according to the legal statutes.

The death-rate of Camden for the three months mentioned is one in every one hundred and sixty-seven population; and the number of zymotic disease deaths as given is merely to be taken as an estimated factor, for the very reason that the death certificates in many cases merely give the immediate cause of death, thus rendering the task of learning the zymotic influences in the causation of deaths a most difficult one.

According to the given estimates, the proportion of zymotic deaths to others is as one to four in June, one to five in July, and one to seven in August. The great prevalence of zymotic diseases in Camden, with its excellent natural conditions attending a residence here, is no doubt due to defective sanitary administration.

As to the location of these reported deaths from zymotic diseases, thirty-one out of the forty-nine occurred in the four lower wards, and a large proportion occurred in that portion of the Fifth ward bordering Line ditch. This ground is much of it under grade, and numerous stagnant pools of water are found, without a possible chance of draining. And the present local Board of Health have with commendable

spirit declared the necessity of abating this nuisance by the building of a culvert from this point, Second and Mechanic streets, north into the Kaighn avenue culvert.

Before closing this report, I desire to say that there is much to condemn in the sanitary condition and management of the city. I feel that this report, as the result of a prolonged inspection, loudly calls for the relief embodied in the late enactments of our State laws in regard to local Boards of Health ; not only do we need the protection of such a Board, but one that is largely composed of practical sanitarians and able inspectors, organized according to the spirit and letter of approved sanitary science and administrative art.





